

# 1

## Introduction

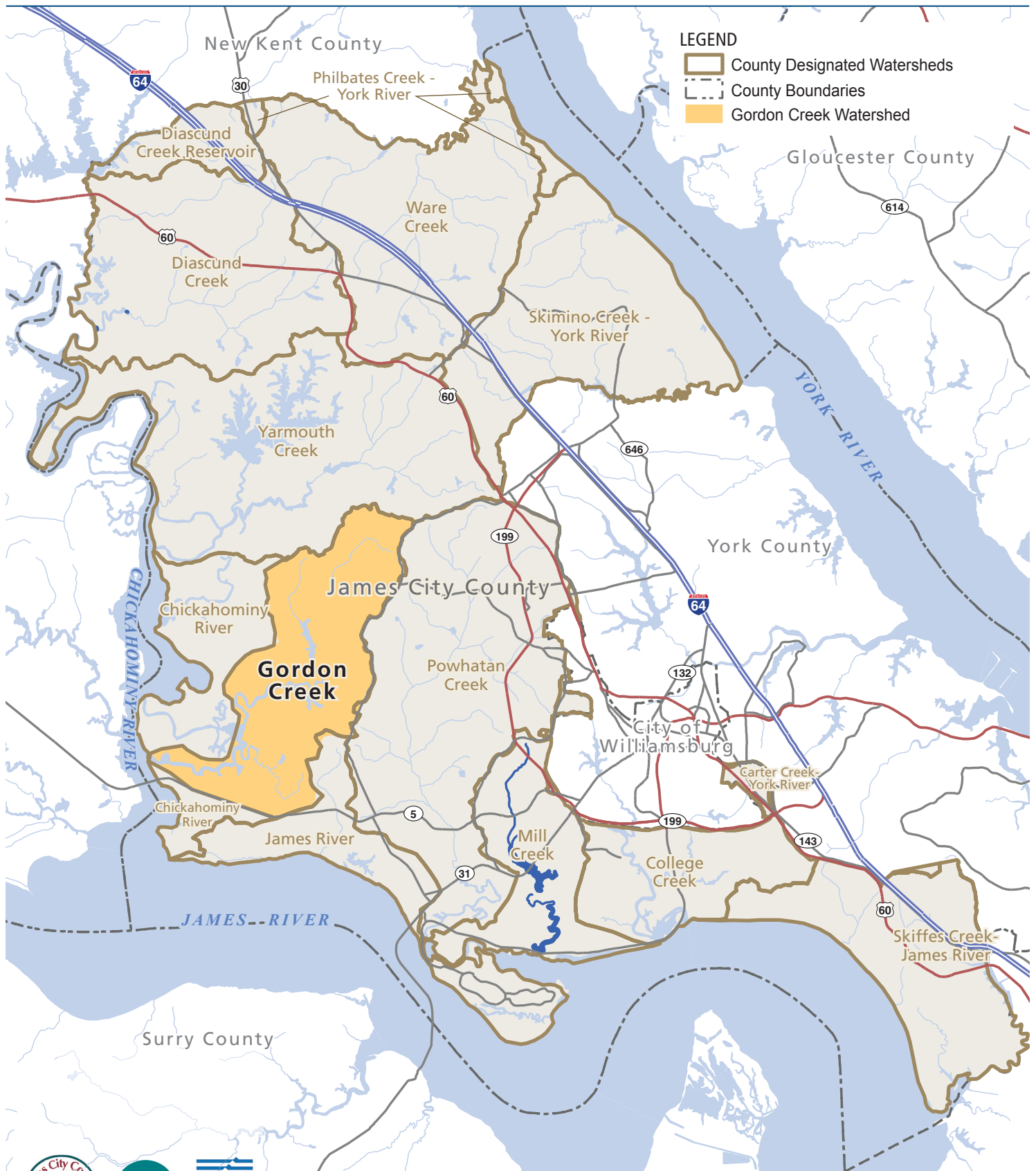
The Gordon Creek watershed lies in the southwestern portion of JCC (Figure 1-1). It is bounded to the north by Jolly Pond Road, to the west by Jolly Pond and Bush Neck Roads, to the south by John Tyler Highway (State Route 5), and to the east by Centerville Road (Figure 1-2). The watershed is 13.8 square miles in area and lies entirely within the County limits. Gordon Creek lies between two other watersheds that have approved watershed management plans, Powhatan Creek (CWP 2001) and Yarmouth Creek (CWP 2003), and drains to the Chickahominy River at the location of Chickahominy Riverfront Park, just upstream of the Route 5 bridge. Setting it apart from other JCC watersheds, Gordon Creek has a degree of protection afforded by the extensive wetlands and surface waters that provide a Resource Protection Area (RPA) accounting for approximately 41 percent of the total watershed area. In addition, approximately 17 percent of the watershed is publicly owned. As a relatively rural watershed that is experiencing increasing land development in the form of residential subdivisions that are currently under construction and/or planned, JCC prioritized Gordon Creek as the next target for watershed management planning.

The Gordon Creek watershed is not called out as a discrete watershed in the National Watershed Boundary Dataset (NWBD), but rather included into the 59.0 square mile Lower Chickahominy River watershed (Hydrologic Unit Code: 02080206). However, for planning purposes, JCC has delineated the 13.8 square mile Gordon Creek watershed using available topographic and hydrographic mapping. As part of their *Gordon Creek Baseline Assessment and Conservation Area Plan*, the Center for Watershed (CWP) further delineated the watershed into eight subwatersheds (Figure 1-2). Subwatersheds 101 through 106 are well forested and characterized by first and second order headwater streams. Subwatershed 201 was designated based primarily on the extent of the normal pool elevation of Jolly Pond and does not include the drainage areas for any major tributaries to Gordon Creek. Lastly, Subwatershed 202 represents the tidal portion of the watershed, totaling 4,693 acres or 53 percent of the total watershed area.

Natural Areas Inventories prepared by the Virginia Department of Conservation's Natural Heritage Program found rare animals present in Colby Swamp (subwatersheds 101 and 201) and "significant natural communities present" in the marshes around Gordon Island at the mouth of



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# GORDON CREEK

## Watershed Management Plan

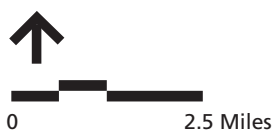
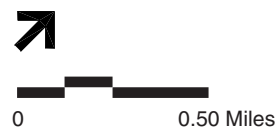
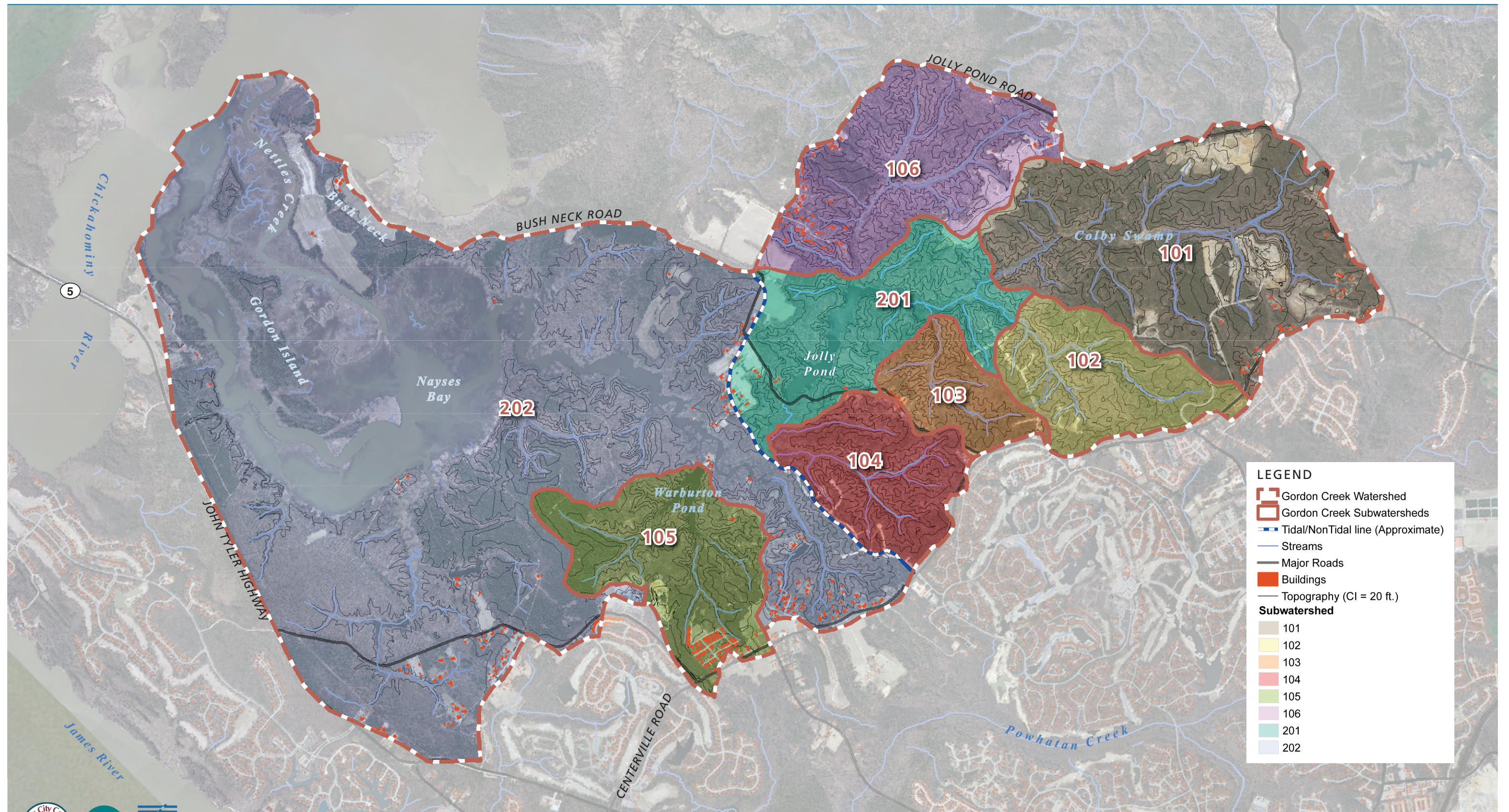


Figure 1-1  
James City County Watersheds





# GORDON CREEK Watershed Management Plan

Figure 1-2

Gordon Creek Watershed and  
Subwatershed Map



the mainstem (DCR 1990). The 2,720-acre Gordon Creek Natural Area<sup>1</sup> is located in this area, encompassing freshwater tidal marshes, stream channels, and bordering upland islands (CWP 2008). The freshwater tidal marshes of Gordon Creek measure over 900 acres, equating to roughly 10 percent of the total watershed area. The tidal portions of the neighboring watershed of Yarmouth Creek directly to the north are very similar to those of Gordon Creek and have been classified as highly significant to the biodiversity of the state (CWP 2008).

The Gordon Creek watershed is 86 percent forested with overall impervious cover at just 1.34 percent (CWP 2008). The principal land use is agriculture with the majority of buildings being single family residences in low-density subdivisions or widely disseminated. Home sites are located predominantly in the upper, non-tidal subwatersheds. Most of these homes lie outside the Primary Service Area (PSA) and are thus connected to on-site septic systems and draw potable water from wells. Most residences are located on lands zoned as General Agriculture (A1), a category which constitutes 81 percent of the overall watershed. Subdivisions currently under construction or with approved plans of development such as Liberty Ridge are located on A1 lands, and future residential development will almost certainly be targeted for these lands.

More concentrated land use practices include JCC-owned facilities such as the landfill, Solid Waste Transfer Station and Jolly Pond Convenience Center, which straddle the upper subwatersheds of 101, 106, and 201. Two school sites are also present in the watershed: Matoaka Elementary School (opened in 2007) in Subwatershed 105, and the combined school site for J. Blaine Blayton Elementary and Lois Hornsby Middle Schools in Subwatershed 101, which opened in 2010. County owned land also includes Freedom Park (subwatersheds 101 and 102, and 201) and Chickahominy Riverfront Park (Subwatershed 202), resulting in a total public landholding of roughly 1,500 acres or 17 percent of the total watershed area.

One of the more notable non-residential and privately owned developments in the Gordon Creek watershed include the Jack L. Massie Contractor, Inc. Mineral Resource Area in Subwatershed 101. This active, open pit aggregate mine is permitted by the Virginia Department of Mines, Minerals and Energy Extraction (DMME). Based on property information records, approximately 155 acres or 13 percent of Subwatershed 101 is actively mined or likely to be mined in the future.

To better understand the natural resources within the Gordon Creek watershed and identify specific opportunities for watershed protection and restoration, the CWP conducted a number of field studies to in 2007 and consulted available databases at JCC, the Virginia Department of Conservation and Recreation (DCR), and the United States Geological Survey (USGS). These studies included a Stream Habitat Assessment and Conservation Area Assessment, the latter including evaluations of contiguous forests, rare, threatened and endangered species habitat, and isolated wetlands. Lastly, the CWP performed a stormwater retrofit inventory and neighborhood

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<sup>1</sup> The Gordon Creek Natural Area is not dedicated as such nor is there a Natural Area Management Agreement in place between the Virginia Department of Conservation and Recreation and the landowner. This designation merely denotes the area as possessing attributes suitable for establishment as a formal Natural Area.





source assessment. The results of their work are provided in detail within the *Gordon Creek Baseline Assessment and Conservation Area Report*, which is available on the JCC website.

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## 1.1 Stream Habitat Assessment

The results of the Stream Habitat Assessment reflect the relatively undeveloped status of the Gordon Creek watershed. Although the ranking system employed by the CWP consists of four categories based on the resulting score (excellent, good, fair and poor), each of the 24 stream reaches fell into the excellent or good category, with the overwhelming majority (17) ranked as excellent. The results of the CWP's assessment are provided in Figure 1-3, with stream reaches color-coded by rank.

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## 1.2 Stream Impact and Stormwater Retrofit Inventory

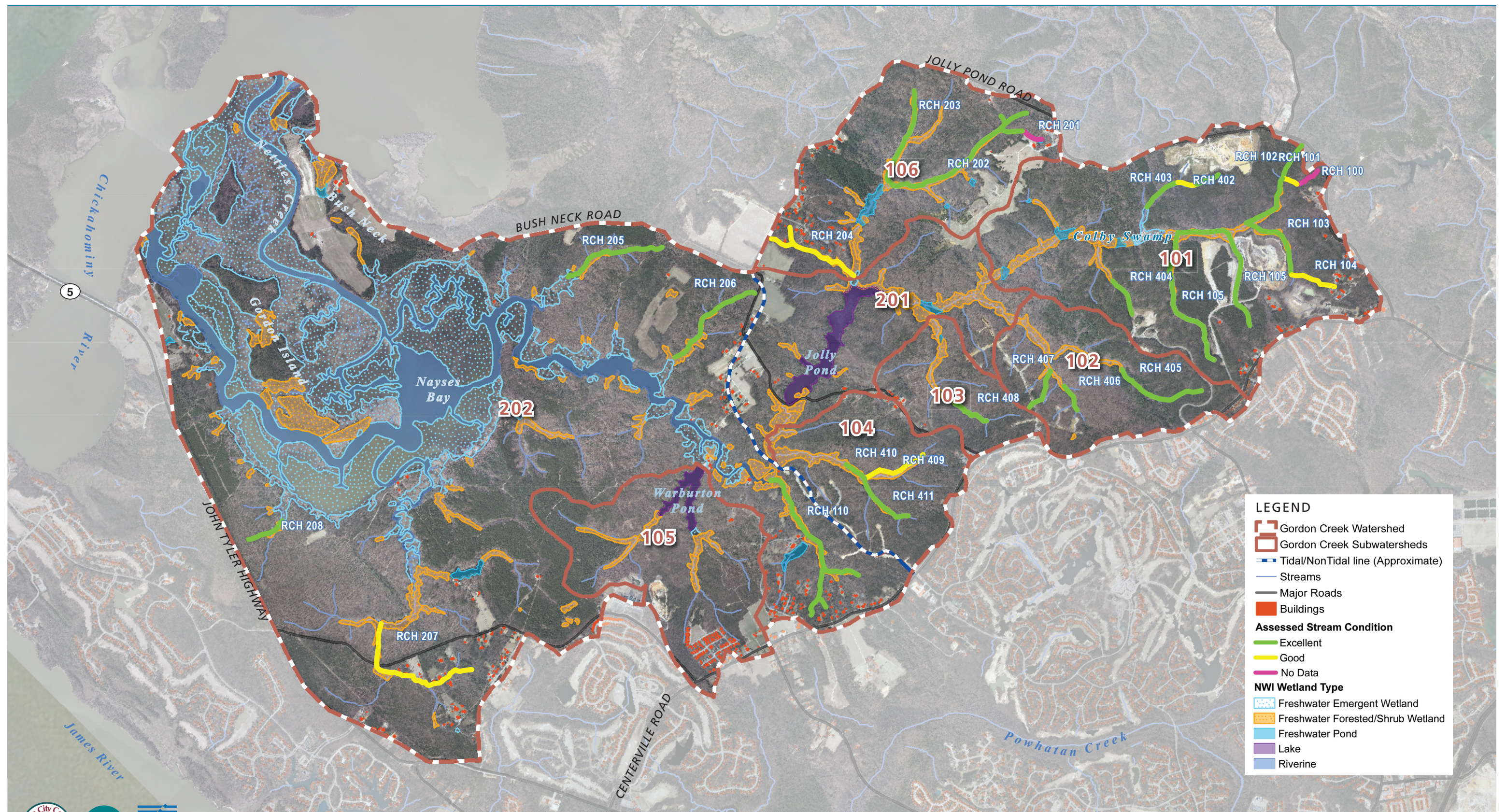
The CWP applied a variety of rapid field assessment methods to collect information on stream impact areas and potential locations for retrofitting inadequate or non-existent stormwater management facilities. Stream impacts were described using select field forms from the CWP's Unified Stream Assessment, or USA (Kitchell and Schueler 2004). These included:

- Storm Water Outfalls (OT);
- Severe Bank Erosion (ER);
- Impacted Buffer (IB);
- Stream Crossing (SC);
- Trash and Debris (TR);
- Channel Modification (CM); and
- Miscellaneous (MI)

Each of the stream impact areas identified by the CWP is included in Table 1-1 along with their description and the prescribed action. Their specific locations are depicted on Figure 1-4.

To further identify and prioritize potential stormwater retrofit and watershed restoration candidates, the CWP revisited the impact areas deemed to have the most potential for retrofit and/or restoration and applied the Neighborhood Source Assessment (NSA) and Retrofit Reconnaissance Investigation (RRI) field forms. The only subdivision deemed suitable for application of the NSA was determined to be the Greensprings Mobile Home Park, located in the southeastern portion of the watershed just off Centerville Road (Figure 1-5). The NSA was conducted to evaluate pollution source areas, stewardship behaviors, and restoration opportunities within individual residential areas. The assessment looks specifically at yards and lawns, rooftops, driveways and sidewalks, curbs, and common areas (CWP 2008).





# GORDON CREEK Watershed Management Plan

Figure 1-3

Gordon Creek Watershed  
Stream Conditions



**Table 1-1. Summary of Stream Impacts and Recommended Actions**

Site ID	Subwatershed	Description	Recommended Action
CM-401	101	Channelization by riprap	None*
IB-100	101	Right bank of Reach 105 cleared for development	None. Is likely compliant with mining activity.*
MI-100	101	Location of old gravel mine	None. Is active*
MI-101	101	Large area of cleared land for development	None
MI-401	101	Beaver dam at end of Freedom Park. Flooding.	Retrofit required (see Table 1-2)
OT-100	101	Single 30 inch metal outfall	None
SC-100	101	Single 12 inch metal culvert crossing at residential driveway	None
SC-101	101	Single 18-inch metal culvert crossing at construction road	None
TR-100	101	Historic dumping in floodplain	Clean up day with stakeholder volunteers*
SC-103	102	Double 4-foot circular concrete pipes on entrance road to Freedom Park	None
MI-500	103	Cleared area near Jolly Pond Road. Contains slash from clearing activities.	None
TR-501	103	Trash dump located behind residence on Jolly Pond Road	Revisit site with landowner permission*
OT-300	104	Single 36-inch circular concrete outfall. Chipped/cracked with moderate flow. Trash present.	Potential retrofit / stream restoration (see Table 1-2)
ER-201	106	Headcut advancing into farm field	Revisit site with landowner permission*
MI-200	106	24-inch deep advancing headcut	Resolve in tandem with Transfer Station retrofit, Table 1-2
MI-202	106	Location of Specimen tulip poplar - 40-inch DBH	Add to County GIS (Virginia Big Tree layer)
OT-201	106	Single 15-inch concrete outfall	None

\* denotes a CWP recommendation modified by VHB based on follow-up fieldwork in January, 2010 or due to time elapsed since initial observation





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data provided by CWP, January, 2008

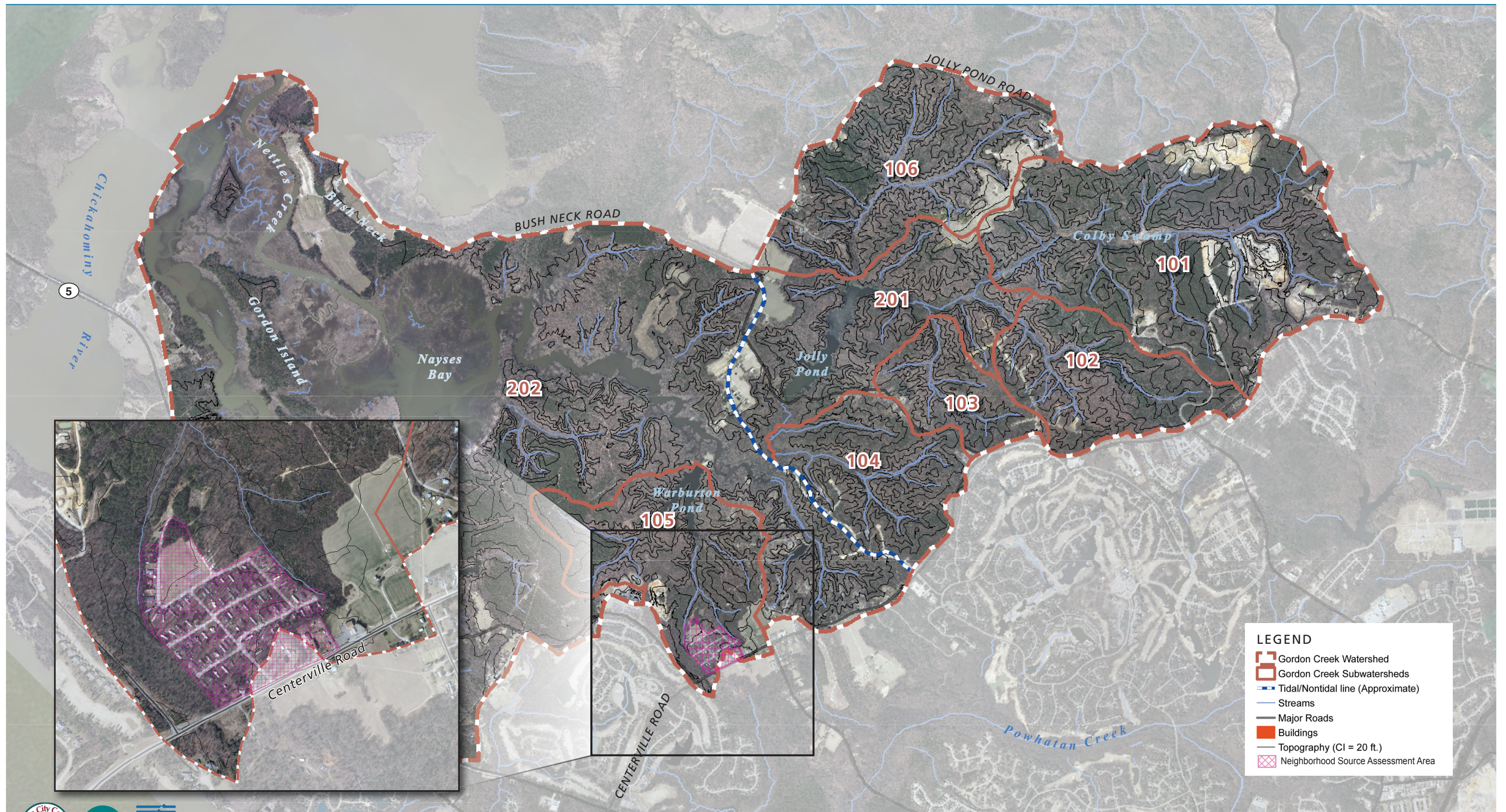
## GORDON CREEK

### Watershed Management Plan

Figure 1-4

Gordon Creek Watershed  
Stream Impacts





# GORDON CREEK Watershed Management Plan

Figure 1-5

Gordon Creek Watershed  
Neighborhood Source Assessment



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data provided by CWP, January, 2008



Using the RRI field form, “the stormwater retrofit potential of each candidate site was evaluated by analyzing drainage patterns, drainage areas, impervious cover, available space, and other site constraints (e.g., conflicts with existing utilities and land uses, site access, and potential impacts to natural areas). Each stormwater retrofit concept was based on the size of the candidate project site, impervious area treated, site constraints, and the overall watershed restoration goals being pursued. Unless there were obvious site constraints and/or evidence that a particular stormwater retrofit would offer few or no watershed benefits, a stormwater retrofit concept was developed.” (CWP 2008).

### 1.2.1 Stormwater Retrofit Results and Prioritization

The Gordon Creek watershed was found to have a relatively small number of potential stormwater retrofit opportunities. Those identified reflect the need to better control stormwater associated with impervious roadways or parking lots (of which there are few in the watershed) or upgrade antiquated structural components. Each of the six candidates recommended by the CWP is presented in Table 1-2.

In January 2010, each proposed retrofit site was visited to reassess its potential and prioritization as reported by the CWP. Additional input from JCC technical staff was also gathered. Based on this additional information and considering the size of the drainage areas for each of these retrofit locations relative to the size of the overall watershed and/or the recommended approach, it was concluded that the retrofits will not have a significant impact on water quality in the watershed. This is a reflection of the relatively undeveloped nature of the watershed and general lack of retrofit opportunities as opposed to a reflection on the site selection process. The same is true regarding the potential for stream restoration sites.

The following recommendations are offered for each of the stormwater retrofit candidates presented in the CWP baseline assessment.

#### **Freedom Park (Colby Swamp) Beaver Dam**

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Freedom Park Beaver Dam at Colby Swamp was identified as a potential retrofit location. Recommendations for management include definition of the spillway and evaluation of the corrugated metal pipe (CMP) culverts. Design improvements must safely pass the 100-year storm event with no downstream impacts. If the CMPs are hydraulically necessary, they should be replaced with a material with a longer lifespan, such as high density polyethylene or reinforced concrete. The spillway could also be enhanced by implementing a planting plan for natural stabilization.

Additionally, JCC is using this area as a utility corridor to service the J. Blaine Blayton Elementary and Lois Hornsby Middle Schools. Care has been taken with regard to the utility design and installation to ensure long-term stability and minimize potential future impacts to downstream resources. These utilities should be evaluated and maintained in accordance with appropriate JCSA guidelines..





**Table 1-2. Summary of Candidate Stormwater Retrofit Sites and Recommendations**

Rank	Priority	Site ID (CWP)	Existing Condition	Description	Recommended Action
1	High	GC-10 (Freedom Park Beaver Dam)	Ad hoc water level control / flood passage structure.	Former beaver dam utility easement for combined school site. Maintains pool elevation in Colby Swamp. Must be designed to pass the 100-year event safely / not be DCR-regulated dam structure.	Shared use opportunities and long-term concerns explored before design.
2	Moderate	GC-04 (Solid Waste Transfer Station)	Existing stormwater basin, created ~1993.	Culvert passing water through road embankment / berm occluded. Headcutting in downstream channel. Left bank riparian area cleared.	Evaluate additional storage potential by using vertical standpipe. Repair headcut. Plant buffer.
3	Low	GC-05 (Freedom Park Parking Lot)	Existing grassy swale at parking lot.	Appears to be already functioning in proposed capacity.	Potential for possible replanting / educational opportunity.
4	Low	GC-01 (Chickahominy Riverfront Park)	Stormwater conveyance in lined ditches / culvert.	Stormwater from parking lot only partially treated, flows in culvert under road and subsequently through driving range to discharge to the Chickahominy River.	Minor regrading of parking lot for positive drainage to existing and adjacent roadside swale. Grassy swales in driving range. Any proposed activity should be considered in the context of the Park's Master Plan.
5	Low	GC-02 (Greensprings Mobile Home Park)	Stormwater pipe and drop inlets.	Stormwater from neighborhood piped under grassy recreational area to neighboring stream. Multiple drop inlets in recreational area present potential hazard to health and safety.	Stream restoration and floodplain reconnection. But needs to be considered in the context of the likelihood of future land redevelopment.
6	None	GC-03 (James River Baptist Church)	Runoff from stormwater curb inlets treated by newly installed wet pond.	Parking lot retrofit carried out. Runoff sent to extended detention/wet pond behind church.	None.

#### **Solid Waste Transfer Station BMP**

The existing stormwater BMP at the Solid Waste Transfer Station was identified as a potential opportunity for extended detention / bioretention. Opportunities to reconfigure the existing outlet from a culvert to a multi-stage outlet control structure to detain small and large storms

were identified. There are also opportunities on the downstream end of the culvert to daylight the culvert earlier, create a water quality swale to minimize downstream erosion, repair the existing headcut (stream impact MI-200, Table 1-1), and replant what is now a cleared and maintained slope on the left riparian area.

#### **Freedom Park Parking Lot Treatment**

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Freedom Park parking lot was identified as a potential extended detention/water quality swale. Based on additional field observations carried out in early 2010, it appears that this system is already functioning in this capacity, with no visible signs of erosion or flooding. Because of the small drainage area associated with this site, it is considered a low priority.

#### **Chickahominy Riverfront Park Pool Area Parking Lot**

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The pool area parking lot at Chickahominy State Park was identified as a potential opportunity for bioretention. The area adjacent to the parking lot and main access drive could be regraded to allow for bioretention before discharging through the culvert to the opposite side of the access drive. There is also potential on the downstream end to create a ponding area to minimize the existing gullies forming between the downstream end of the culvert and the end of the driving range. A potential water quality and quantity mitigation area was identified adjacent to the driving range, just upstream of the culvert beneath the access road to the golf club parking lot. However, all proposed retrofits should be considering in the context of the County's Master Plan for the park (JCC 2009).

#### **Greensprings Mobile Home Park Daylighting Opportunity**

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Greensprings Mobile Home Park was identified as a potential location to daylight an existing drainage pipe running across a community recreational area. This work would involve stream restoration, and would improve potential for flood attenuation and associated water quality as well as education value. However, interest in potential land redevelopment may preclude project implementation. In addition, the septic system in the northeast corner of the subdivision has failed, creating a more pressing public health issue and water quality issue. Restoration design would need to account for the potential loss of recreational space and the need for public safety.

#### **James River Baptist Church**

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James River Baptist Church was identified as a potential bioretention site. However, field reconnaissance and coordination with JCC staff confirmed that there is a stormwater management basin located in the back of the site that is currently treating runoff from the Church's parking lot. Therefore, this retrofit candidate has been removed from the list.

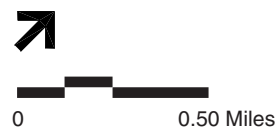
The five remaining stormwater retrofit opportunities are depicted in Figure 1-6, color-coded in terms of their priority.





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data provided by CWP, January, 2008

## GORDON CREEK

### Watershed Management Plan

Figure 1-6

**Gordon Creek Watershed  
Stormwater Retrofit Ranking**



### 1.2.2 Opportunities for Stream Restoration

As previously mentioned, favorable results were obtained during the Stream Habitat Assessment. This means that stream restoration opportunities were not formally presented by the CWP in their baseline assessment. Only one instance of channel modification was noted: the placement of riprap channel protection downstream of the Freedom Park parking lot (CM-401, Table 1-1, Figure 1-4). Natural channel design is recommended at this location as soils are erodible and especially prone to headcutting. Furthermore, Freedom Park is being expanded and will include a new interpretive center currently being designed (see Master Plan, Appendix A).

As will be discussed in subsequent Section 3.5, Freedom Park represents a particularly suitable marshalling location for Gordon Creek watershed activities. In such an event, the stream restoration project could provide a valuable educational opportunity to discuss the merits of natural channel design, especially when linked to an upstream bioretention swale as a “treatment train” approach. Before such a project is undertaken, consideration should be given to whether the stone materials now armoring the channel can be reused in the restoration design.

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## 1.3 Conservation Area Study

Within the *Gordon Creek Baseline Assessment and Conservation Area Plan*, the CWP presented detailed background research and field efforts used to identify potential conservation areas within the Gordon Creek watershed. Their efforts included obtaining information on rare, threatened and endangered species habitats and surveys from the DCR’s Division of Natural Heritage and performing forest community and wetland functional assessments. The CWP proposed six high priority conservation areas, based on their value to watershed protection. Scores were assessed on a scale from 0 to 75. Details on ranking and assessment criteria can be found in the *Conservation Area Plan*. Recommended approaches and activities in these conservation areas vary by location and include enhanced protection of riparian buffers, application of sustainable land use practices and low-impact development, active management for loblolly pine monocultures, and reforestation of agricultural land. Strategies for stakeholder interaction to facilitate watershed stewardship and relay the importance of land conservation are discussed in greater detail in Chapters 2 and 3.

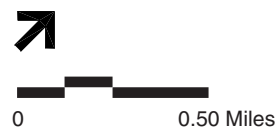
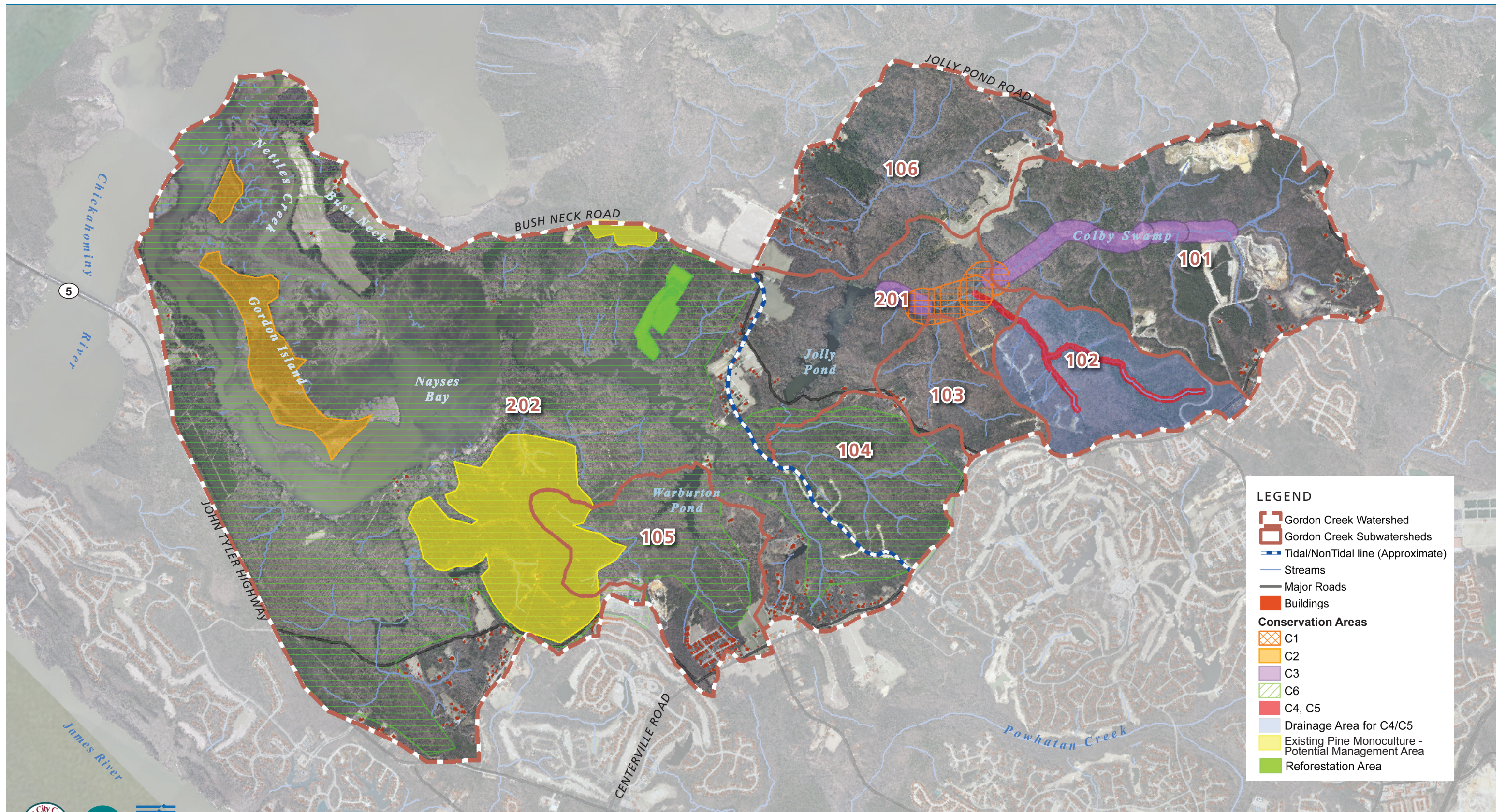
The proposed conservation areas are summarized in Table 1-3 and their locations are provided in Figure 1-7. Each of the conservation areas is included on subwatershed-scale maps in Chapter 6.





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data provided by CWP, January, 2008

## GORDON CREEK

### Watershed Management Plan

Figure 1-7

**Gordon Creek Watershed  
Conservation Areas**





**Table 1-3. Proposed Conservation Areas in the Gordon Creek Watershed**

Rank	ID	Approximate Area (acres)	Description	Score	Management Recommendations from Original Baseline Assessment
1	C1	396	Location of eagle's nest, high quality wetland, and mature contiguous forest. This area and adjoining lands are slated for development (Liberty Ridge).	59	300 foot minimum buffer* for the mainstem of Gordon Creek with a 500 foot buffer around the eagle's nest**. Low impact development is recommended for the design of Liberty Ridge. Also investigate the potential for reforestation of the old landfill.
2	C4	N/A	Location of high quality streams, wetland, and mature contiguous forest. Evidence of development to take place in the near future (Liberty Ridge).	52	100 foot minimum buffer* for the streams. Low impact development is recommended.
3	C6	3,258	Downstream half of the Gordon Creek watershed, consisting of the tidal mainstem. Contains large privately owned parcels.	51	Stakeholders in this area should decide on protection requirements. Promote mixed hardwood forest by active management of pine monocultures. Reforest cleared land to create larger contiguous blocks.
4	C3	149	Beaver modified dam that has resulted in a high quality wetland downstream and a large pond upstream.	48	300 foot minimum buffer* for the mainstem of Gordon Creek.
5	C2	170	Old growth islands in the tidal mainstem containing mature contiguous forest and specimen trees.	47	Minimize hydrologic impacts and direct disturbance.
6	C5	N/A	Stream reach in Freedom Park that contains shell marl.	46	100 foot minimum buffer* for the stream.

\* These management recommendations are unchanged from those included in the 2008 Baseline Assessment and Conservation Area Plan (CWP 2008). This watershed management plan does **not** propose the establishment of mandatory buffers on any streams beyond those currently required by Chapter 23 of the County Code entitled "Chesapeake Bay Preservation." Strategic Actions that promote **voluntary** buffer establishment are contained in Chapter 3.

\*\* Landowners must comply with the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, the Virginia Endangered Species Act, various regulations for the State Protection of Wildlife Species, and the Bald Eagle Protection Guidelines for Virginia, jointly prepared by the Virginia Department of Game and Inland Fisheries and the U.S. Fish and Wildlife Service.